

CLAIM AMENDMENTS

1. (Currently Amended) A method for making ~~transition~~ metal-substituted cobalt ferrite comprising the steps of:

mixing oxides or carbonates of Fe, Co, and M in the targeted proportions to form a mixed powder, where M is selected from the group consisting of Mn, Cr, Zn, Al, Cu, and any mixtures thereof;

pressing the mixed powder; calcining the mixed powder at a temperature in the range of approximately 900°C to 1200°C for a period of time ranging from about 2 to about 24 hours in air;

ball milling the mixed powder to less than 38 micron powder;

pressing and calcining the mixed powder at a temperature in the range of approximately 900°C to 1200°C for a period of time ranging from about 2 to about 24 hours in air;

remilling the mixed powder to less than 38 micron powder;

mixing the mixed powder and forming the mixed powder into a desired shape; and

sintering the mixed powder at a temperature in the range of approximately 1000°C to 1350°C for a period of time ranging from about 2 to about 24 hours in air, thereby forming the ~~transition~~ metal-substituted cobalt ferrite.

2. (Original) The method of claim 1 wherein the metal being substituted into the compound is manganese.

3. (Original) The method of claim 2 wherein the manganese substituted cobalt ferrite has a general formula $\text{CoFe}_{2-x}\text{Mn}_x\text{O}_4$ where x is about 0 to about 1.0.

4. (Original) The method of claim 2 wherein the manganese substituted cobalt ferrite has a general formula $\text{Co}_{1-y}\text{Mn}_y\text{Fe}_2\text{O}_4$ where y is about 0 to about 0.95.

5. (Original) The method of claim 2 wherein the manganese substituted cobalt ferrite has an amplitude of magnetostriction of at least about 50 to about 250 ppm.

6. (Currently Amended) ~~The A method of claim 1 for making transition metal-substituted cobalt ferrite comprising the steps of:~~

mixing oxides or carbonates of Fe, Co, and M in the targeted proportions to form a mixed powder, where M wherein the metal being substituted into the compound is a transition metal (TM) and any mixtures thereof;

pressing the mixed powder; calcining the mixed powder at a temperature in the range of approximately 900°C to 1200°C for a period of time ranging from about 2 to about 24 hours in air;

ball milling the mixed powder to less than 38 micron powder;

pressing and calcining the mixed powder at a temperature in the range of approximately 900°C to 1200°C for a period of time ranging from about 2 to about 24 hours in air;

remilling the mixed powder to less than 38 micron powder;

mixing the mixed powder and forming the mixed powder into a desired shape; and

sintering the mixed powder at a temperature in the range of approximately 1000°C to 1350°C for a period of time ranging from about 2 to about 24 hours in air, thereby forming the transition metal-substituted cobalt ferrite.

7. (Currently Amended) The method of claim 6 wherein the TM is selected from the group consisting of chromium (Cr), zinc (Zn), aluminium (Al) and copper (Cu)

8. (Currently Amended) The method of claim 7 wherein the transition metal-substituted cobalt ferrite has a general formula $\text{CoFe}_{2-x}\text{TM}_x\text{O}_4$ wherein TM is selected from the group consisting of Cr, Mn, Zn, Al, Cu, and any mixtures thereof and x is about 0 to about 1.0.

9. (Currently Amended) The method of claim 7 wherein the transition metal-substituted cobalt ferrite has a general formula $\text{Co}_{1-y}\text{TM}_y\text{Fe}_2\text{O}_4$ where TM is selected from the group consisting of Cr, Mn, Zn, Al, Cu, and any mixtures thereof and y is about 0 to about 0.95.

10. (Original) The method of claim 1 further comprising the step of adding a metallic binder to the mixed powder prior to the step of remilling the mixed powder.

11. (Original) The method of claim 10 wherein the step of adding a metallic binder includes the step of adding Ni powder and Ag powder wherein the Ag powder comprises a larger volume fraction of the metallic binder and the Ni powder comprise a least volume fraction of the metallic binder.

12. (Currently Amended) The method of claim 1 further comprising the step of adding an organic binder to the remilled mixed powder ~~after the step of remilling the mixed powder thereby forming an organically bound powder~~ and wherein the sintering steps of ~~mixing the mixed powder and pressing the mixed powder into a desired shape and sintering the mixed powder at a temperature in the range of approximately 1000°C to 1350°C for a period of time ranging from about 2 to about 24 hours in air comprises the steps of mixing the organic bound powder and pressing the organically bound powder into a desired shape and sintering the organic bound powder occurs in air~~ at approximately 1350°C for 24 hours ~~in air~~ and cooling down the resulting sintered metal substituted cobalt ferrite ~~organically bound powder by one of cooling the sintered organic bound powder either inside a furnace at a controlled cooling rate in the range of about 4°C per hour to about 850°C per hour and or by removing the resulting sintered metal substituted cobalt ferrite organically bound powder from the furnace to room temperature air.~~

13. (Original) The method of claim 12 further comprising the step of heating the organically bound powder at about 500°C for about 5 hours to allow the organic binder to burn out.

14. (Original) The method of claim 2 wherein the manganese-substituted cobalt ferrite has a reduction in Curie temperature of up to about 300 degree Celsius.